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(Farm Science Serves the Nation No. 1)

WHY THE APPLES STAYED ON THE TREES

Report of plant hormone research, including discovery of an apply spray that prevents pre-harvest drop and saves fruit growers four million dollars a year. Broadcast by Ernest Moore and Duke DuMars, Office of Information, U. S. Department of Agriculture. Script by Josephine Hemphill. Recorded October 24, 1944.  
Time: 9 minutes, 44 seconds.

ANNOUNCER: (LIVE)

From the United States Department of Agriculture -- a visit by transcription with Ernie Moore and Duke DuMars. Today our Farm Science Reporter is going to tell us a story, "Why the Apples Stayed on the Trees."

TRANSCRIPTION

ERNIE MOORE:

Yes, that's the story. Why certain apples stayed on the trees, till they were red and ripe and full of flavor -- while bushels of other apples fell to the ground, before they were ready to harvest. It's also the story of a couple of men -- who tried out a simple trick -- and found it would save fruit growers four million dollars a year.

DUKE DUMARS:

Ernie, did you say "a simple trick?"

MOORE:

That's what it was, Duke. All those plant scientists did -- was spray a couple of apple trees -- to see if the apples would hang on.

DUMARS:

What made them think the apples would hang on?

MOORE:

Well, that part of the story goes back a good many years -- and takes in the work of many people. As you know -- the stuff they used on those apples was what is called "plant hormone."

DUMARS:

But what is a plant hormone?

MOORE:

Tell -- you don't happen to know any Greek, do you?

DUMARS:

I don't speak it fluently, no.

MOORE:

The word "hormone" comes from the Greek. It means -- "I arouse to activity."

DUMARS:

Makes the plant wake up and get to work?

MOORE:

You might say it speeds up the work. About 65 years ago, some of the plant scientists got interested in why plants grow as they do. Why they grow toward the light, for instance. So they got some young oat plants, put 'em near a lamp, and in hardly any time at all -- the plants were growing toward the light.

DUMARS:

But Ernie --

MOORE:

Yes?

DUMARS:

I'd know that! If I put oat plants...in a window...I'd expect them to grow toward the light.

MOORE:

Why would they grow toward the light?

DUMARS:

Why -- the light would just naturally draw them.

MOORE:

What part of the plant?

DUMARS:

Any part. The whole thing. I s'pose -- except the roots.

MOORE:

Are you sure about that?

DUMARS:

Well...what did the plant scientists find out.

MOORE:

That the most sensitive part...of the oat plant...is the tip. When they covered the tip with a small cap, made of tinfoil -- then the plant did not turn toward the light.

DUMARS:

Grow the same as if there wasn't any lamp?

MOORE:

Yes. Which indicated there was something in the tip -- (that's the hormone) -- that traveled down to the lower part of the stem and made the plant bend toward the light.

DUMARS:

I never knew that before!

MOORE:

To show it even more clearly, they cut off the tips of the plants, and then put a few back on, so the two cut surfaces were touching. Again all the plants were placed near the lamp -- but this time only those plants with the tips put back on curved toward the light.

DUMARS:

Is that a fact?

MOORE:

Sure it's a fact! And it proved...this hormone will stimulate an oat plant even through a cut surface.

DUMARS:

But they had to get the tip back -- on the same plant it grew on!

MOORE:

No, it worked on any oat plant. Now don't get the idea there's only one hormone -- or that it's always in the tip. You find hormones in pollen, for example. In corn, it's hormones in the pollen that regulate growth.

DUMARS:

Of the corn plant, you mean.

MOORE:

Of other plants. If you knew how -- by using certain hormones, you could make roots grow on a bean leaf.

DUMARS:

But that wouldn't get me anywhere!



MOORE:

No, because you're not a scientist. If you were a scientist, like my friend Dr. J. W. Mitchell -- who told me all about this research -- then you'd see the connection. You'd begin to wonder. If a hormone would grow roots on a bean leaf -- wouldn't it also grow roots where you wanted them to grow. And that is -- exactly -- what happens. Have you ever tried to root a holly cutting?

DUMARS:

No. I've heard it's a tough job.

MOORE:

It used to be -- till the holly growers started using this hormone stuff to make roots grow on the cuttings. Nurserymen use hormones when they root certain flowers. Azaleas, for example, and carnations. There's one thing I want to make clear, before we go any farther. After the scientists discovered those natural plant hormones, they found there are chemicals that have the same effect.

DUMARS:

Chemicals that act like hormones?

MOORE:

Yes. They're used on holly, to make the leaves and berries stay on. The scientists discovered this while they were experimenting with the holly cuttings. When they put hormone on the holly flowers, the flowers would develop into beautiful red berries, and the berries would stay on the stem. Also the leaves would stay on -- when treated with hormone.

DUMARS:

But why would the leaves stay on?

MOORE:

Do you know why leaves fall...from oak and maple trees?

DUMARS:

They always fall...in the fall.

MOORE:

They fall -- because a layer of cells -- forms in the stem -- and cuts off the leaf. There's something in hormone that keeps these cells from forming -- or at least delays formation -- so the holly leaves and berries will stay on.

DUMARS:

Must have been a pretty important discovery for the holly growers.

MOORE:

It certainly was! The chemical they used on holly is naphthalene acetic acid. One part to 10,000 parts of water.

DUMARS:

That all it takes?

MOORE:

It's powerful stuff! Now let's get back to those apples. It was late in June, 1939, that a couple of plant scientists, Dr. Frank Gardner and Dr. Paul Marth, were driving down the road — past some apple trees — on the farm at Beltsville, Maryland. The apples were a new summer variety named "Close." C-l-o-s-e. Developed in the Department of Agriculture. Just out of curiosity, I looked up our first report on this apple. Want to read it?

DUMARS:

Sure. "The tree is vigorous and yields well, the fruit is bright red, but as with most summer apples, many fruits drop too soon. For this reason it is difficult to harvest all the apples at one time."

MOORE:

Well, that was the trouble with a good many other varieties, and it was costing the growers plenty of money. Just before the apples were fully ripe they'd fall to the ground. Get all bruised up. And the grower would lose a big part of his crop and his income.

DUMARS:

Couldn't he pick the fruit early?

MOORE:

Yes, but if he picked the fruit early -- before it began to drop -- then the apples wouldn't be as big and well-colored as they ought to be. Well, as I was saying, —

DUMARS:

It was late in June, 1939.

MOORE:

A couple of plant scientists — on their way to work — happened to be driving past some apple trees. The driver pulled over to the side of the road — and stopped

(PAUSE)

VOICE 1:

Let's take a look at these apple trees.

VOICE 2:

Loaded, aren't they.

VOICE 1:

"Close" is sure a nice apple -- but how it drops! Started already.

VOICE 2:

You know I've been doing a lot of thinking lately.

VOICE 1:

About those hormones -- we used on the cuttings?

VOICE 2:

Yes. They certainly make the leaf stems and flowers stick on.

VOICE 1:

Well -- I guess it wouldn't hurt to try it.

VOICE 2:

Let's get going!

(PAUSE)

MOORE:

They made up a hormone solution...came back to the apple trees...bringing along a spray rig. (Had a little trouble there at first -- getting the thing started.)

VOICE 2:

Crank 'er again -- and see if she won't go.

VOICE 1:

I never did see a spray rig yet -- that would go!

VOICE 2:

This cussed -- gol-darned --

VOICE 1:

Quit talking -- and dump in the hormone.

VOICE 2:

Hey! What you doing there!

VOICE 1:

Sorry! Didn't mean to douse your coat like that.



VOICE 2:

Turn it on. Let's get these trees sprayed.

VOICE 1:

Spray these two right here?

VOICE 2:

Okay. And we'll leave these two for checks.

(PAUSE)

MOORE:

They sprayed two of the trees...left two un-sprayed. (And I might say -- every ten minutes or so they'd go down to see if anything'd happened yet.) Two days later...same place...same men.

(PAUSE)

VOICE 1:

Golly! How they fell off the trees we didn't spray! Must be two bushels over here.

VOICE 2:

How about the trees we did spray? Count the apples there!

VOICE 1:

Three...four...how many you got?

VOICE 2:

Six. This can't be all!

VOICE 1:

Here's another one.

VOICE 2:

I can't believe it! Only eleven apples fell off !

VOICE 1:

Here -- this makes it twelve.

VOICE 2:

But only twelve! S'pose we've actually hit on something --

VOICE 1:

That'll keep apples on the tree till they're ready to pick?

VOICE 2:

Yeah!

VOICE 1:

Let's get the Chief out here -- to look at these things!

VOICE 2:

He won't believe it!

VOICE 1:

Nobody will. Let's get him down here!

(PAUSE)

MOORE:

Well Duke -- that's what happened.

DUMARS:

Fast work, I'd say!

MOORE:

It certainly was. And were people excited about it! Doctor Magness, in charge of the work...Doctor Auchter, Chief of the Bureau...apple growers...the Secretary of Agriculture...members of the Congress...it seemed as if everybody rushed out there to see those apple trees!

DUMARS:

No wonder. What did they do next?

MOORE:

They rounded up all the apple trees on the farm. Another plant scientist, Dr. L. P. Batjer, followed straight through the season -- testing the spray on early apples and late apples. Early McIntosh. Delicious. Rome Beauty, Stayman Winesap. In all, they treated 23 different varieties, and it worked to some extent on every one.

DUMARS:

Made them hang on, till they were ready to harvest.

MOORE:

The point is — they hang on till you're ready to pick 'em. And brother, do they hang on! I was out there one day... when the snow was on the ground...and the boys showed me some trees with apples still holding on. In some cases only the core was left — but the stem was still hanging on to that tree for dear life! The apples that were picked at the right time -- Well, I've got one here in my pocket. Stayman Winesap. Ever see a prettier apple than this?

DUMARS:

Never did! How'd you get that color on it?

MOORE:

Came with the apple. You see, Duke -- if an apple stays on the tree long enough, the color deepens. Has time to really develop.

DUMARS:

That one's a beauty. Say! What would happen if you got too much hormone. Wouldn't the apples stick so tight -- you'd have to chop 'em off with a hatchet?

MOORE:

They might. But you won't have any trouble -- if you follow directions that come with the spray. And speaking of fast work! Just a few months after the spray was discovered, it was on the market. Last year the dealers sold enough to spray a hundred thousand acres of fruit trees. On some varieties, this spray has cut the drop from 50 percent to as little as one percent.

DUMARS:

Not bad!

MOORE:

Mighty good -- if your income depends on your apple crop. Now there are two things to watch out for -- when you put on the spray. Get it on at the right time, and cover the tree thoroughly -- so the spray will reach every twig.

DUMARS:

Do these hormones -- chemicals -- do other things?

MOORE:

They do so many things.....We've told how they speed up rooting of holly -- and flower cuttings. The scientists are also using hormones to root tropical plants. Cinchona, for example, from which we get quinine -- and plants grown for insecticides. And there's still another experiment going on there at Beltsville. One that'll mean a lot -- to everybody in the country. But they won't let me talk about that one yet.

DUMARS:

Why not?

MOORE:

Oh, you know how careful -- those scientists are.

DUMARS:

Always want to be sure.

MOORE:

That's it. But in a few months we'll have the good news. Now, are there any questions?

DUMARS:

Yes! What're you going to do with that apple?

MOORE:

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Give it to you.

DUMARS:

Thank you sir.

MOORE:

This apple -- represents the practical results -- of experiments that mean four million dollars a year, to the fruit growers.

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ANNOUNCER: (LIVE)

You've heard the story of why apples -- treated with hormone spray -- stick to the tree till they're ready to harvest. This is the first of a series, from the United States Department of Agriculture, on how "Farm Science Serves the Nation."

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